AV108
Versatile SBC

3U VPX, ZYNQ 7045 SOC
FMC, XMC Carrier
Conduction or Air-Cooled

ApisSys

High Speed Data Conversion
& Signal Processing Solutions

AV108

Applications

- Real time processing
- Electronic Warfare
- Radar receiver
- LIDAR

Features

- User programmable Xilinx® ZYNQ™ 7000 7030 or 7045 EPP
- 533 MHz 256M32 DDR3 SDRAM
- 8 Gb NAND FLASH
- One FMC slot, High Pin Count
- One XMC slot, PCIe x4
- 3U VPX form factor
- OpenVPX standard compliant
- Air cooled and Conduction cooled rugged versions
- FPGA firmware cores
- Linux® Operating System support

Overview

The AV108 is part of ApisSys' range of High Speed data conversion and signal processing solutions based on the VITA 46, VPX standard.
The AV108 is fully compliant with OpenVPX MOD3-PAY-2F2T-16.2.5-3 module profile with PCIe Gen 2 on Fat Pipe DP01 and DP02 and 1000BASE-T on control plane CPtp01 and CPtp02.
The AV108 combines the flexibility of the Xilinx® ZYNQ™-7000 Extensible Processing Platform with the support of either one FMC mezzanine or one XMC mezzanine. Thanks to its Dual ARM® Cortex™-A9 MPCore™ with CoreSight™ and NEON™ floating point extension, the AV108 combines the capabilities of a Single Board Computer running Operating Systems such as Linux or VxWorks with the real time processing power and versatility of an FPGA based board.
The AV108 includes one Xilinx® ZYNQ™-7000 EPP 7030 or 7045, one high speed 1 GB DDR3-1066 SDRAM memory for data processing and one 8 Gb NAND FLASH memory for software/firmware storage.
The AV108 provides one FMC High Pin Count interface and one XMC interface supporting PCIe Gen 2 x4. The AV108 also features one USB2.0 interface on the VPX P2 connector.
The AV108 comes with complete software drivers for Windows and Linux. An FPGA firmware package is provided including all cores necessary to build user FPGA applications

Extensible Processing Platform – EPP

The AV108 is fitted with a Xilinx ZYNQ-7000 XC7Z030 or XC7Z045 user programmable EPP.
The ZYNQ-7000 features a Dual ARM® Cortex™-A9 MPCore™ with CoreSight™ Debug and Trace technology, clocked at up to 800 MHz.
The ZYNQ-7000 supports the NEON™ single/double precision floating point extension for each processor.
The ZYNQ-7000 XC7Z030 Programmable Logic features 125k Logic Cells along with 265 Bloc RAM (36 Kbit each) and 400 DSP slices.
The most powerful version embeds a XC7Z045 which provides 350k Logic Cells, 545 Bloc RAM (36 Kbit each) and 900 DSP slices for an impressive processing power of up to 1 TMACs
Both versions feature a PCIe Gen2 interface block.
Almost all Programmable Logic resources are available for customer processing.
The ZYNQ-7000 EPP is delivered in -2 speed grade.

DDR3 SDRAM and FLASH Memories

The AV108 includes one 256M32 (1 GB) DDR3-1066 SDRAM memory clocked at 533 MHz for a peak data rate of 4 GB par second.
The AV108 includes one 8 Gbit NAND FLASH used to store the EPP software and firmware applications.
HDMI
The AV108 includes one HDMI interface compliant v1.4 supporting video formats up to 1080p or UXGA.

VPX interface

The AV108 features an OpenVPX VITA 65 MOD3-PAY-2F2T-16.2.5-3 module profile compliant interface with support for one PCIe x8, or two PCIe x4 or eight PCIe x1 plus two 1000BASE-T/1000BASE-X Ethernet interface.
The AV108 also supports one USB2.0 and the HDMI interface on VPX P2.

FMC interface

The AV108 features a VITA 57 – FMC (FPGA Mezzanine Card) compliant slot.
The FMC supports High Pin Count (HPC) interface with up to 80 differential signal pairs.
The FMC interface also supports 4 high-speed serial links (FPGA GTXs) running at up to 12.5/13.1 Gbit/s in full duplex mode (ZYNQ-7000 XC7Z045 only)

XMC interface

The AV108 features one VITA 42 XMC (switched Mezzanine Card) slot supported via a PCIe Gen 2 x4 interface.
The XMC J16 connector IOs are mapped on the VPX P2 as defined by the VITA 46.9 standard, P2w7-X8d+X12d pin mapping.

Firmware

The AV108 comes with a firmware package which includes VHDL cores allowing control and communication with all AV108 hardware resources.
A base design is provided which demonstrates the use of the AV108 and gives users a starting point for firmware development.
The AV108 firmware package is supported on the Xilinx ISE® 14 design suite and later.
Software
The AV108 is delivered with an embedded Linux Operating System.
An application example is provided as source code.

Ruggedization

The AV108 is delivered in air-cooled and conduction cooled standard or rugged versions for use in severe environmental conditions.
Standard VITA 47 supported ruggedization levels are EAC4, EAC6, ECC3 and ECC4.

Specifications

FPGA

- Xilinx ZYNQ-7000 Extensible Processing Platform
  - XC7Z030-2FFG676 or
  - XC7Z045-2FFG676 Memory
- 1 bank 256M x 32-bit DDR3 SDRAM, 533 MHz clock
- One 8 Gbit NAND FLASH memory

VPX interface

- P1:
  - PCIe Gen2 1x8, 2x4 or 8x1 on Data plane
  - 2 x 1000BASE-T / 1000BASE-X on Control plane
  - HDMI
  - USB 2.0
  - UART
- P2:
  - XMC J16 P2w7-X8d+X12 pin mapping

FMC interface

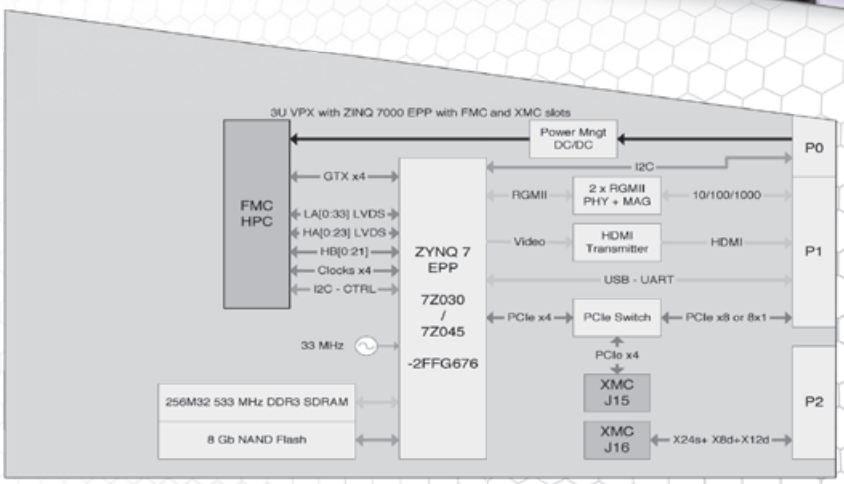
- 1.8V or 1.5V VADJ, default to 1.8V
- HPC: 80 differential pairs:
  - LA(0:33): default to LVDS
  - HA(0:23): default to LVDS
  - HB(0:21): default to LVDS
- 4 MGT up to 12.5/13.1 Gbps (ZYNQ XC7Z045 only).

XMC interface

- PCIe Gen2 x4 interface on J15
- J16 mapped to VPX P2.
- +5V powered

Miscelaneous

- Real Time clock
- Temperature monitoring
- Power supply monitoring Firmware support
- VHDL cores for all hardware



resources

- Base design
- Supported by Xilinx ISE 14 and later

Software support

- Operating System:
  - Linux
- Application example:
  - Linux

Ruggedization

- As per VITA 47:
  - Air cooled : EAC4 and EAC6
  - Conduction cooled : ECC3 and ECC4

Power

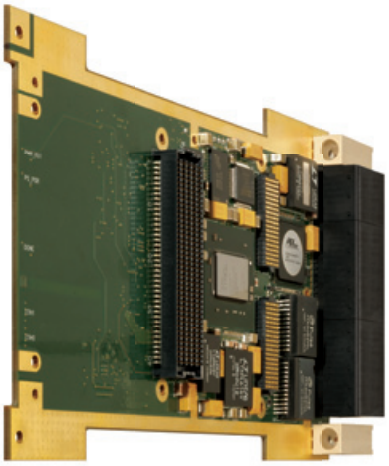
- +12V: 1.5 A max (18.0W)
- +5V: 3.0 A max (15W)
- +3.3V: 0.9 A max (3.0W)
- +3.3VAUX: 0.2 A max (0.6W)

Weight

- Air cooled : 400g
- Conduction cooled : 400g

Ordering information

Part Number		A	V	108	-	rr	-	a
Ruggedization level	Air Standard	-	-	-	-	AS	-	-
	Air Rugged	-	-	-	-	AR	-	-
	Conduction Standard	-	-	-	-	CS	-	-
	Conduction Rugged	-	-	-	-	CR	-	-
Options 1	EPP ZYNQ XC7Z030-2FFG676(C/I)	-	-	-	-	-	-	1
	EPP ZYNQ XC7Z045-2FFG676(C/I)	-	-	-	-	-	-	2



Ruggedization levels

	Air flow, Standard AS (VITA 47 EAC4)	Air flow, Rugged AR (VITA 47 EAC6)	Conduction Standard CS (VITA 47 ECC3)	Conduction Rugged CR (VITA47 ECC4)
Operating Temperature	0°C to +55°C (1) (8 CFM airflow at sea level)	-40 to +70°C (1) (8 CFM airflow at sea level)	-40°C to +70°C (Card Edge)	-40°C to +85°C (Card Edge)
Non Operating Temperature	-40°C to +85°C	-50°C to +100°C	-50°C to +100°C	-55°C to +105°C
Operating Vibration (Random)	5Hz - 100Hz +3 dB/octave 100Hz-1kHz = 0.04 g2/Hz 1kHz - 2kHz -6 dB/octave	5Hz - 100Hz +3 dB/octave 100Hz - 1kHz = 0.04 g2/Hz 1kHz - 2kHz -6 dB/octave	5Hz - 100Hz +3 dB/octave 100Hz - 1kHz = 0.1 g2/Hz 1kHz - 2kHz -6 dB/octave	5Hz - 100Hz +3 dB/octave 100Hz - 1kHz = 0.1 g2/Hz 1kHz - 2kHz -6 dB/octave
Operating Shock	20g, 11 millisecond, half-sine	20g, 11 millisecond, half-sine	40g, 11 millisecond, half-sine	40g, 11 millisecond, half-sine
Operating Relative Humidity	0% to 95% non-condensing	0% to 95% non-condensing	0% to 95% non-condensing	0% to 95% non-condensing
Operating Altitude	@ 0 to 10,000 ft with adequate airflow	@ 0 to 30,000 ft with adequate airflow	@ 0 to 30,000 ft	@ 0 to 60,000 ft
Conformal Coating	No	Optional (default acrylic 1B31)	Yes (default acrylic 1B31)	Yes (default acrylic 1B31)

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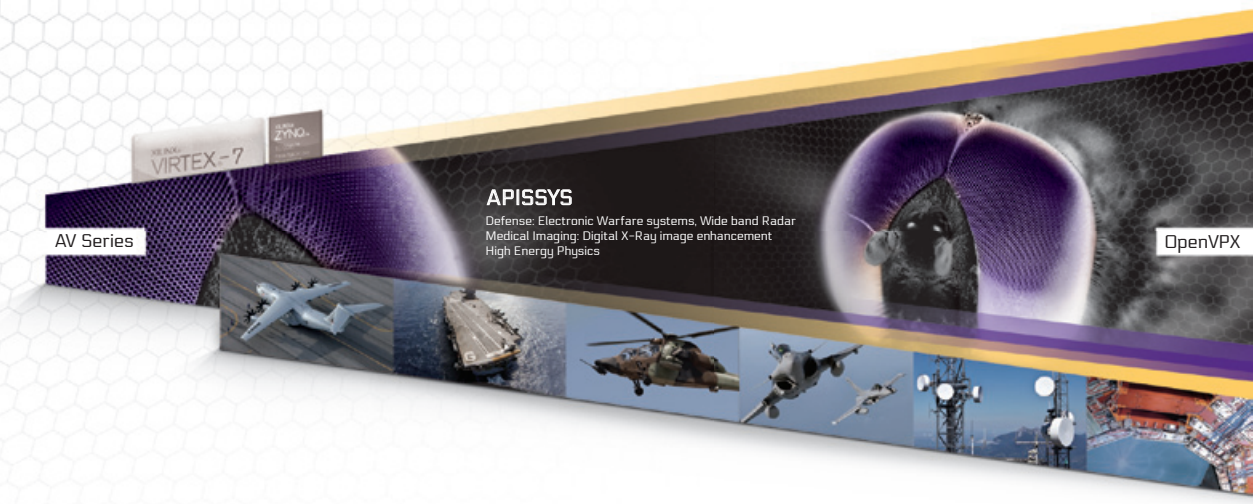
Design By vert-pomme.ch - 04.2013



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